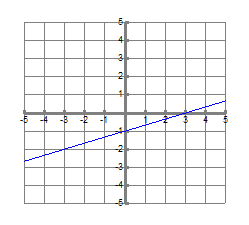
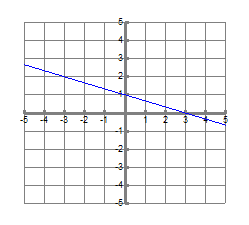
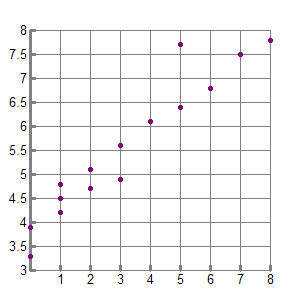
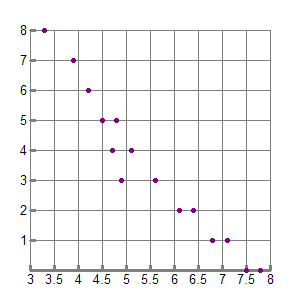
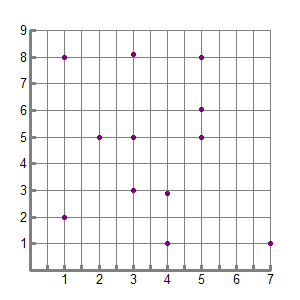
Name Date Block

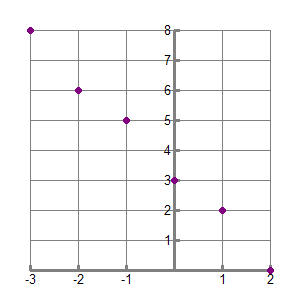
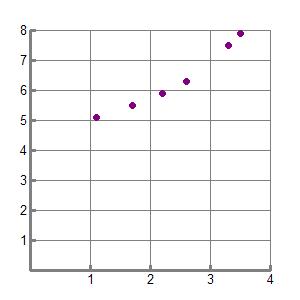
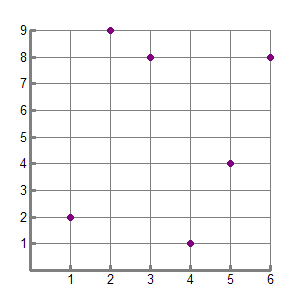
 Note-taker: Fitting a Line to Data (Linear Regression) ~ Table to Equation

We know that, in general, a line with a ***negative slope*** looks like this.

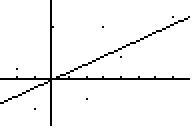
We know that, in general, a line with a ***positive slope*** looks like this.

A scatter plot is the graph of a set of . Correlation means how the points in the scatter plot are related to each other. Here are some examples:

Example 1: Determine the Correlation of a Scatter Plot

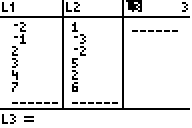
1. 2. 3.



Sometimes there is no single line that passes through all of the data points, so you try to find the line that best fits the data. Fitting a line to data is called finding the line of or linear .

To create a scatter plot, calculate and draw regression equation:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***x*** | -2 | -1 | 2 | 3 | 4 | 7 |
| ***y*** | 1 | -3 | -2 | 5 | 2 | 6 |

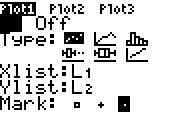


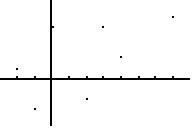
1**. To enter the set of data in a list:**

* Press **STAT**; **1**
* If there is already data in the list, arrow up and

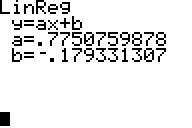
highlight L1, press **CLEAR** and arrow once down.

* Enter the data into L1 (*x-*values).
* Enter the data into L2 (*y-*values).

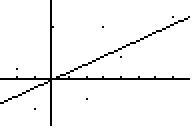
**2. To create a scatter plot:**

* Enter data into a list.
* Press **Y=** and clear any equations.
* Press **2nd, Y=, 1**
* Highlight **ON** and press **ENTER.**
* Arrow down and select type: scatter plot.
* Xlist should read L1 and Ylist should read L2.
* Press **ZOOM 9** (ZOOM Stat).

**3. To calculate the line of best fit:**

* Press **STAT**.
* Arrow over to **CALC** and select **4**(**LinReg (ax+b))**.
* Continue by pressing: **2nd 1 COMMA**, **2nd 2 COMMA**.
* Continue by pressing: **VARS** and arrow over to **Y**-VARS.
* Finish by pressing: **ENTER, ENTER, ENTER**.

The line of regression is: .



**4. To graph the line of best fit:**

* Press **Y=.**
* Press **GRAPH**.

Example 2: Writing an Regression Equation from a Table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***x*** | 1.0 | 1.5 | 1.7 | 2.0 | 2.0 | 1.5 |
| ***y*** | 3.8 | 4.2 | 5.3 | 5.8 | 5.5 | 6.7 |

1. Equation:

Correlation:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***x*** | 3.0 | 3.5 | 3.7 | 4.0 | 4.0 | 4.5 |
| ***y*** | 9.9 | 9.7 | 8.6 | 8.1 | 8.4 | 7.4 |

2. Equation:

Correlation:

(continued) Note-taker: Fitting a Line to Data (Linear Regression)

Try These in Your Team…

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***x*** | -3 | -2 | -1 | 0 | 1 | 2 |
| ***y*** | 8 | 6 | 5 | 3 | 2 | 0 |

3. Equation:

Correlation:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***x*** | 1.1 | 1.7 | 2.2 | 2.6 | 3.3 | 3.5 |
| ***y*** | 5.1 | 5.5 | 5.9 | 6.3 | 7.5 | 7.6 |

4. Equation:

Correlation:

Example 3: Writing an Regression Equation for a Real-Life Model

1. The table shows the average number of gallons of milk a family drinks per week.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Family Size*** | 1 | 2 | 3 | 4 | 5 | 6 |
| ***# of Gallons*** | 1 | 1.5 | 2.2 | 3.8 | 4.7 | 5 |

a. Find the regression equation.

b. Find the milk consumption in one week of a 7-member family.

2. The table shows the number of dollars (in billions) spent on toys and sports supplies in the United States from 1990 through 1995.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Years Since 1990*** | 0 | 1 | 2 | 3 | 4 | 5 |
| ***Billions of Dollars*** | 31.6 | 32.8 | ? | 36.5 | 40.1 | 42.7 |

a. Find the regression equation.

b. Estimate the amount spent on toys and sports supplies in 1992.